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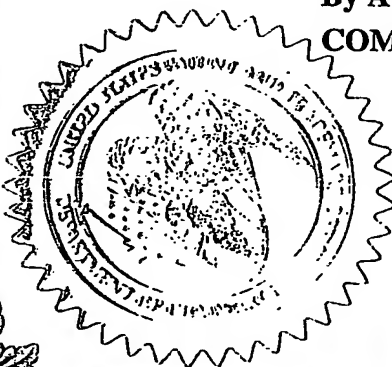
APPLICATION NUMBER: 60/513,085

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

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This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

Atty. Docket No. CMB 0102 PRV		
INVENTOR(s)		
FIRST NAME & MIDDLE INITIAL	LAST NAME	RESIDENCE (CITY & EITHER STATE OR FOREIGN COUNTRY)
Michael	Beri	North York, Ontario, Canada
Additional inventors are being named on the <u> </u> separately numbered sheets attached hereto.		
TITLE OF THE INVENTION (500 characters max.)		
DRUM BRAKE SHOE WITH REPLACEABLE BRAKE BLOCKS		
DIRECT ALL CORRESPONDENCE TO:		
CUSTOMER NO. 22045		
ENCLOSED APPLICATION PARTS (check all that apply)		
<input checked="" type="checkbox"/> Specification - Number of Pages <u>7</u>	<input type="checkbox"/> CD(s), Number <u> </u>	
<input checked="" type="checkbox"/> Drawing(s) - Number of Sheets <u>2</u>	<input type="checkbox"/> Other: Specify <u> </u>	
<input type="checkbox"/> Application data sheet. See 37 CFR 1.76.		
METHOD OF PAYMENT OF FILING FEES (check one)		
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.	PROVISIONAL FILING FEE AMOUNT(S)	AMOUNT SUBMITTED OR TO BE CHARGED TO DEPOSIT ACCT.
<input checked="" type="checkbox"/> A check or money order is enclosed to cover the Provisional Filing fees.	\$160.00 (large) \$ 80.00 (small)	\$ 80.00
<input type="checkbox"/> The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number: <u> </u>		

- ☒ Please charge any additional fee or credit any overpayment in connection with this filing to our Deposit Account No. 02-3978.
- ☒ The invention was not made by an agency of the United States Government or under a contract with an agency of the United States Government.
- ☐ The invention was made by an agency of the U.S. Government or under a contract with an agency of the U.S. Government. The name of the agency is , and the contract number is .
- ☒ A return postcard is enclosed.

Respectfully submitted,

SIGNATURE Kevin J. Heinl
REGISTRATION NO. 29,805

DATE October 21, 2003
TYPED or PRINTED NAME Kevin J. Heinl
TELEPHONE (248) 358-4400

CERTIFICATION UNDER 37 C.F.R. § 1.10

I hereby certify that this correspondence is being deposited with the United States Postal Service via Express Mail Label No. EV 141 487 554 US in an envelope addressed to: Mail Stop Provisional Patent Application, Commissioner for Patents, U.S. Patent & Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 on:

October 21, 2003
(Date of Deposit)

Angelika Phillips
(Name of Person Signing)

Angelika Phillips
(Signature)

DRUM BRAKE SHOE WITH REPLACEABLE BRAKE BLOCKS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to drum brakes for land vehicles.

5 2. Background Art

Conventional drum brake shoes normally include a brake shoe having a partial cylindrical surface. Brake blocks are either individually molded to a brake plate or formed in a slab and fastened to the steel brake shoe by the use of rivets. In either process, rivets used to secure the friction material and backing plates to the
10 brake shoe extend through the friction material backing plate and brake shoe.

Holes are drilled through the friction material and counterbore holes are formed in the friction material to provide access for a riveting tool to rivet the brake blocks to the brake shoe. The current manufacturing process for manufacturing brake blocks for brake shoes is labor intensive. Eliminating drilling
15 through the friction material to form access holes for rivets and counterbore holes for receiving a rivet tool reduces friction material waste. Elimination of holes in the outer surface of the friction material reduces the potential for braking noise caused by foreign material becoming lodged in the holes in the friction material. Eliminating holes also increases the available braking surface and results in
20 improved for trucks and other land vehicles.

With current drum brake shoes, when the lining is worn to a point beyond the recommended extent, as much as 95% of the steel shoe may contact the brake drum.

Conventional brake blocks for conventional drum brakes have a
25 partial cylindrical backing plate that is mated to the partial cylindrical surface of the brake shoe. Rivets secure the brake blocks to the brake shoe and are the sole mechanism for resisting sheer forces between the brake blocks and the brake shoe

when the brake engages the brake drum. Sheer forces develop as the brake shoe is pressed against the drum because brake drum rotation is slowed by contact with the friction material of the brake blocks.

5 When a brake is used in reverse, the rotational forces applied to the brake blocks are reversed. If the brakes are frequently used in reverse or if the brakes are applied in an emergency stop while the vehicle is moving in reverse, the rivets may distort or stretch rivet holes in the friction material. If the rivets holes become enlarged the friction material may become loose. Any looseness of the rivets relative to the friction material may create unwanted noise or improper brake
10 feel.

When brake shoes are rebuilt and reinstalled in a vehicle, the first brake application may result in only 40% to 50% of the surface of the friction material actually contacting the brake drum. In a short period of time, of over 3 or 4 days or possibly 50 to 100 brake applications, the friction material may wear until
15 75%-80% of the friction material surface contacts the brake drum. Braking performance is improved as the proportion of friction material surface contacting the brake drum increases.

There is a need for an improved brake shoe having brake blocks that have improved resistance to sheer forces, reduced manufacturing costs, reduced
20 friction material waste, reduced break-in period, and that provide maximum friction material surface contact even when the friction material is worn to the maximum extent. There is also a need for brake shoes having brake blocks that are designed to minimize noise and vibration.

The above problems and needs are addressed by applicant's invention as
25 summarized below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a side elevation view of a brake shoe having a plurality of flat sides to which brake blocks including friction material, a backing plate and rivets are secured;

5 FIGURE 2 is a plan view of a brake block secured to a portion of a brake shoe taken along the line 2-2 in Figure 1;

FIGURE 3 is a partial cross-sectional view taken along the line 3-3 in Figure 2;

10 FIGURE 4 is a cross-sectional view taken along the line 3-3 in Figure 2 of a brake block attached to a brake shoe prior to flaring the rivet fastener to secure the brake block to the brake shoe;

FIGURE 5 is a cross-sectional view taken along the line 3-3 in Figure 2 of a brake block secured to a brake shoe after flaring the rivet to permanently secure the brake block to the brake shoe;

15 FIGURE 6 is a cross-sectional view of a brake block after it is almost completely worn away;

FIGURE 7 is a side elevation view of an alternative embodiment of a brake shoe having a partial cylindrical wall to which brake blocks including friction material, a backing plate, and rivets are secured;

20 FIGURE 8 is a plan view of the alternative embodiment of the brake block; and

FIGURE 9 is a cross-sectional view of the alternative embodiment of the brake block taken along the line 9-9 in Figure 8.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Referring to Figure 1, a brake shoe 10 is shown to include a wall 12 having a plurality of flat sections 14. The brake shoe 10 also includes a pair of ribs 16 that are welded to one side of the wall 12. Ribs 16 have straight sections 18 onto which the flat sections 14 of the wall 12 are welded.

A plurality of brake blocks 20 are secured to the brake shoe 10. The brake blocks 20 include a flat backing plate 22 and a block of friction material 24. The block of friction material 24 has an arcuate braking surface 26 that is adapted to engage a brake drum (not shown). A pair of side surfaces 28 are provided on opposite sides of the block 24. The side surfaces 28 are slightly canted or tapered to facilitate molding the block of friction material 24. A backing plate bonding surface 30 is provided on the block of friction material 24. A bonding agent may be applied to either the backing plate 22 or bonding surface 30 to facilitate bonding the block of friction material 24 to the backing plate 22.

Rivets 32 are attached to the brake blocks 20 and extend through the backing plates 22 and into holes 34 in the wall 12. Rivets 32 are initially retained on the brake blocks 20 by the friction material 24 that is molded over or bonded to the backing plate 22.

Referring to Figures 2 and 3, the structure of the brake blocks 20 is described in greater detail. The brake blocks 20 are secured to the backing plate 22 in a molding process wherein the friction material is molded to the backing plate 22 with a bonding agent being provided between the backing plate and block of friction material 24. A plurality of apertures 36 are provided in the backing plate 22 so that during the molding operation the friction material is molded into the apertures 36 to supplement the bond between the friction material 24 and backing plate 22.

Referring to Figure 4, one of the brake blocks 20 is shown as initially installed on the brake shoe 10. The rivet 32 is inserted into a hole 34 in the wall 12. A countersunk hole 38 is provided in the backing plate 22 to receive the head 40 of

the rivet 32. An unflared tip 42 of the rivet 32 is shown extending through the brake shoe 10.

Referring to Figure 5, the brake block 20 is shown as it is permanently secured to the brake shoe 10 by the rivet 32. The unflared tip 42 as shown in Figure 3 has been flared to form a flared tip 44. The rivet 32 provides metal-to-metal contact between itself and the holes 34 in the wall 12 and the countersunk holes 38 in the backing plate 22.

As shown in Figure 6, the corners 48 formed at the intersection of the flat sections 14 will be the first part of the brake shoe 10 to contact the brake drum. It is recommended that the brake blocks 20 be replaced before they are worn to this point. However, if the brake blocks 20 are worn until the corners contact the brake drum, braking will create noise alerting the driver to replace the brake blocks while 95% of the friction material surface area remains available.

Referring to Figure 7, an alternative embodiment of the brake shoe 50 is shown to include a partial cylindrical wall 52. The brake shoe 50 includes a pair of ribs 56 that are welded to one side of the wall 52.

A plurality of brake blocks 60 are secured to the brake shoe 50. The brake blocks 60 include a curved backing plate 62 and a block of friction material 64. The block of friction material 64 has an arcuate braking surface 66 that follows the contour of the backing plate 62 and is adapted to engage a brake drum (not shown). A pair of side surfaces 68 are provided on opposite sides of the block 64. The side surfaces 68 are tapered to facilitate molding the block of friction material 64. A backing plate bonding surface 70 is provided on the block of friction material 64. A bonding agent may be applied to either the backing plate 62 or bonding surface 70 to facilitate bonding the block of friction material 64 to the backing plate 62.

Rivets 72 are attached to the brake blocks 60 and extend through the partial cylindrical wall 52. Rivets 72 are initially retained on the brake blocks 60 by the friction material 64 that is molded over or bonded to the backing plate 62.

Referring to Figures 8 and 9, the structure of the brake blocks 60 is illustrated to show how the brake blocks 60 are secured to the backing plate 62. A molding process is used in which the friction material is molded to the backing plate 62 with a bonding agent being provided between the backing plate and block of friction material 64. A plurality of apertures 76 are provided in the backing plate 62 so that during the molding operation the friction material is molded into the apertures 76 to supplement the bond between the friction material 64 and backing plate 62.

Referring to Figure 9, one of the brake blocks 60 is shown prior to being installed on the brake shoe 50. The rivet 72 is inserted into a hole 74 in the wall 52. The hole 74 must be slightly over sized to provide clearance for the rivets as they are inserted into the holes 74 because the rivets do not extend in parallel from the backing plate. For example, to receive a 0.25 inch diameter rivet 72 the holes 74 should be 0.275 inches in diameter. A countersunk hole 78 is provided in the backing plate 62 to receive the head 80 of the rivet 72. An unflared tip 82 of the rivet 72 is shown extending through the brake shoe 50.

The brake block 60 is permanently secured to the brake shoe 50 by the rivet 72. The unflared tip 82 as shown in Figure 9 is flared to secure the brake block 60 to the brake shoe 50. The rivet 72 provides metal-to-metal contact between itself and the holes 74 in the wall 52 and the countersunk holes 78 in the backing plate 62.

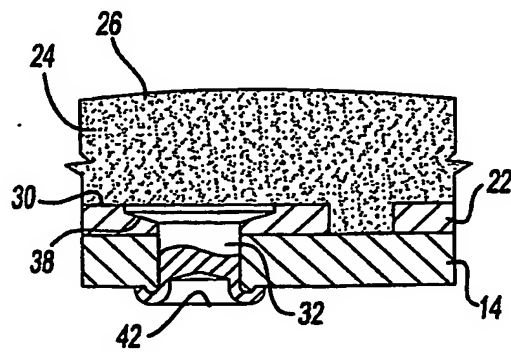
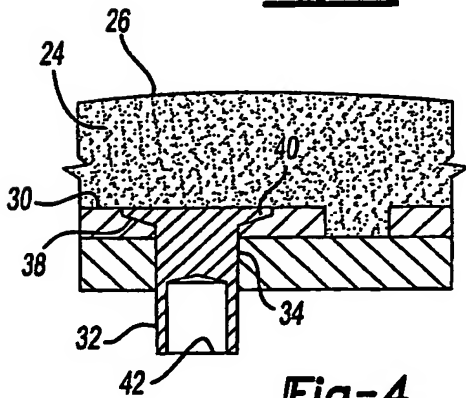
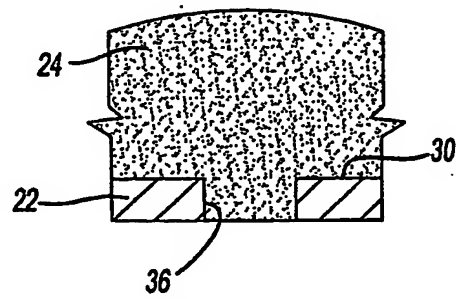
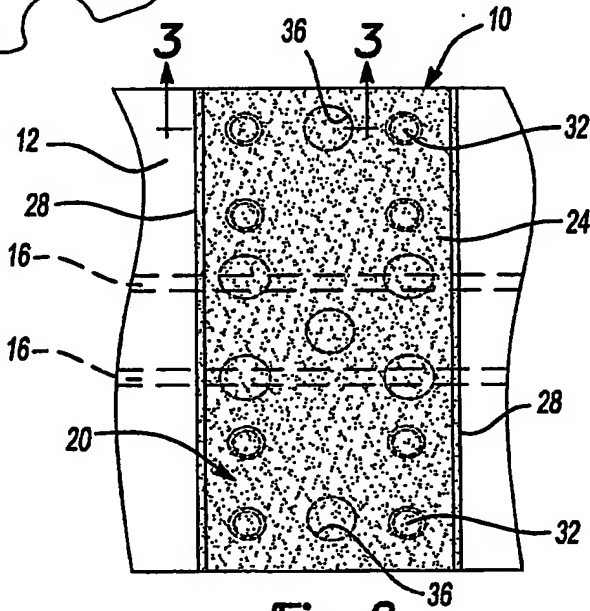
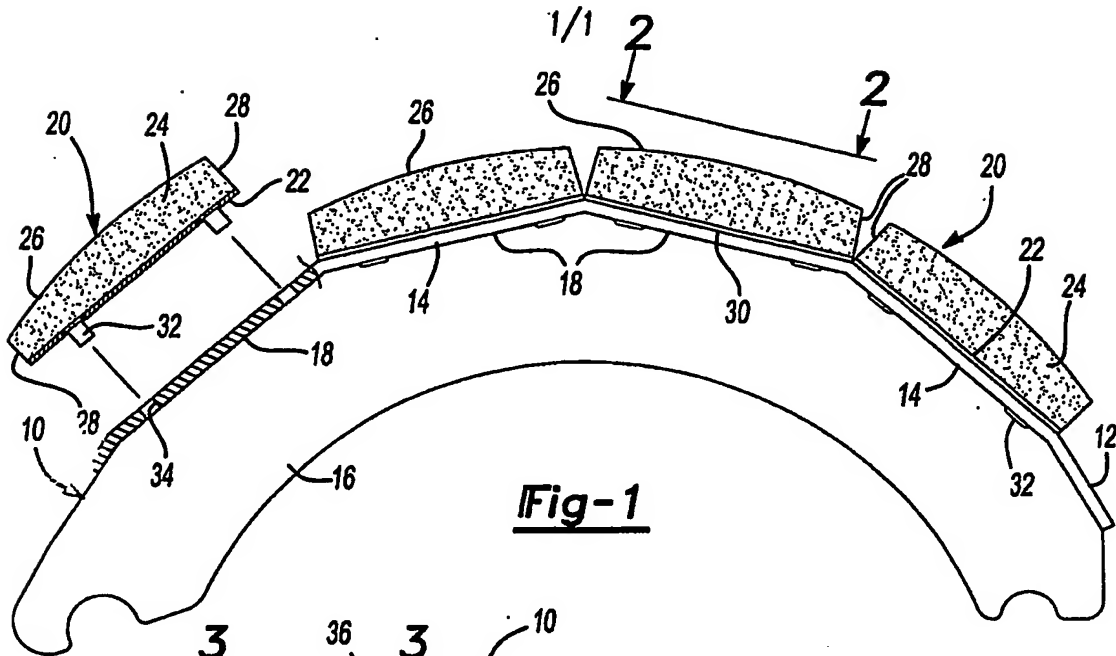
After the brake blocks 20 or 60 are secured to the brake shoe 10 or 50, respectively, the assemblies are placed in a specialized grinding machine that grinds the brake blocks to a predetermined radius specification. When installed on a vehicle, more than 90% contact with the brake drum may be realized immediately with no break-in period provided that the brake drum is within specifications.

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes
5 may be made without departing from the spirit and scope of the invention.

Title: DRUM BRAKE SHOE WITH REPLACEABLE BRAKE BLOCKS

First Named Inventor: Michael Beri

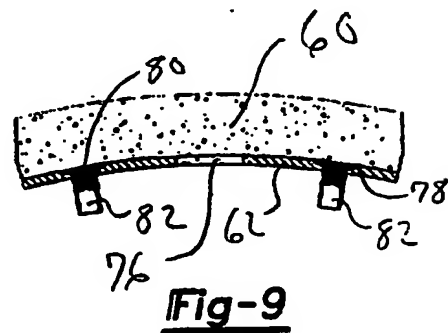
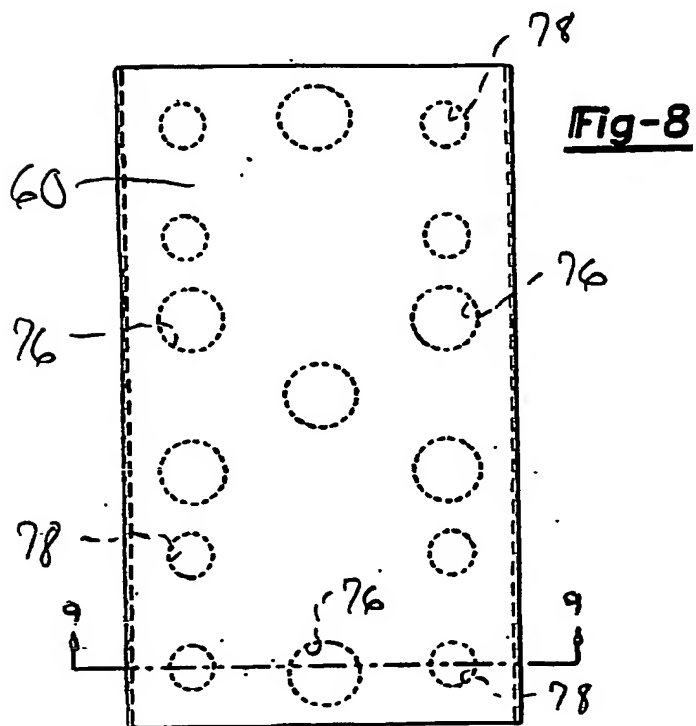
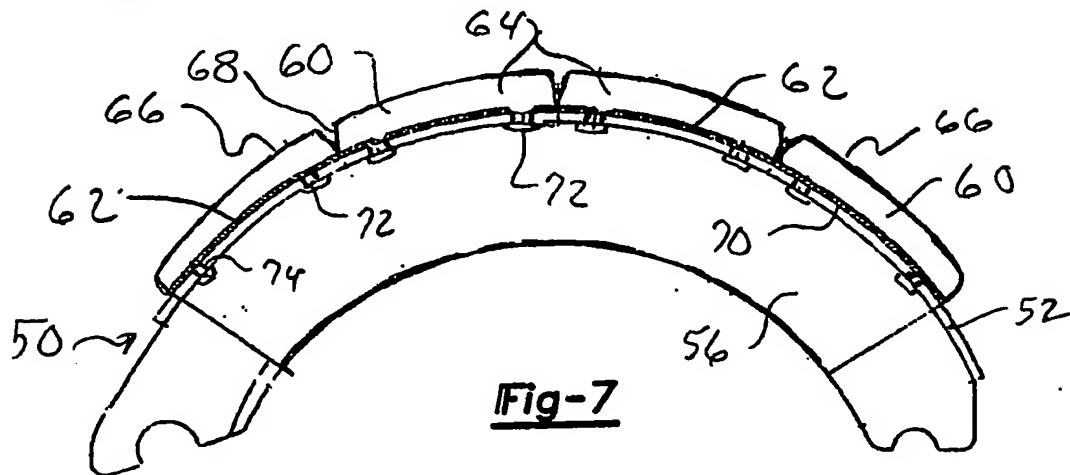
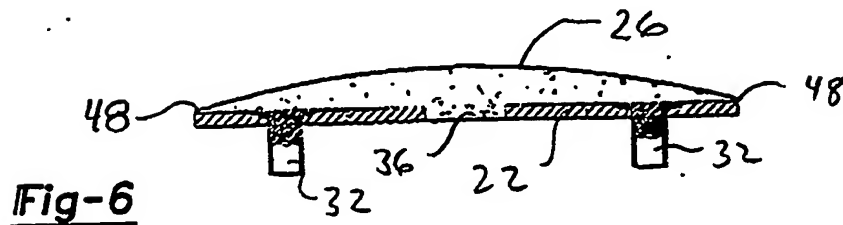
Atty. Docket No.: CMB 0102 PRV



Title: DRUM BRAKE SHOE WITH REPLACEABLE BRAKE BLOCKS

First Named Inventor: Michael Beri

Atty. Docket No.: CMB 0102 PRV



Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)

The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should

**Declaration of inventorship (Rules 4.17(iv) and 51bis.1(a)(iv))
for the purposes of the designation of the United States of America:**

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application (if furnishing declaration pursuant to Rule 26ter).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications:

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. §1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name: Michael Beri

Residence: Ontario, Canada
(city and either US state, if applicable, or country)

Mailing Address: 31 Codsell Avenue
..... North York, Ontario, Canada, M3H 3V7

Citizenship: Canadian

Inventor's
(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date: 18-OCT-04
(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

Name:

Residence:
(city and either US state, if applicable, or country)

Mailing Address:

Citizenship:

Inventor's Signature:
(if not contained in the request, or if declaration is corrected or added under Rule 26ter after the filing of the international application. The signature must be that of the inventor, not that of the agent)

Date:
(of signature which is not contained in the request, or of the declaration that is corrected or added under Rule 26ter after the filing of the international application)

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".